Indian Explosives Act (IV of 1884).

SEVENTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPLOSIVES IN INDIA,

BEING HIS

Annual Report for the Year ending 31st March 1906.

CALCUTTA:
OFFICE OF THE SUPERINTENDENT OF GOVERNMENT PRINTING, INDIA.
1906.

Indian Explosives Act (IV of 1884).

SEVENTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF EXPLOSIVES IN INDIA,

BEING HIS

Annual Report for the Year ending

31-

CALCUTTA:
OFFICE OF THE SUPERINTENDENT OF GOVERNMENT PRINTING, INDIA,
1906.

Seventh Annual Report of the Chief Inspector of Explosives, India.

No. 752.

FROM

MAJOR C. A. MUSPRATT-WILLIAMS, R.A.,

Chief Inspector of Explosives,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,
DEPARTMENT OF COMMERCE AND INDUSTRY.

Calcutta, the 29th May 1906.

SIR,

I HAVE the honour to submit herewith a report of the work of my Department for the year ending 31st March 1906.

Personnel.

2. This Department suffered a great loss during the year in the death of Honorary Captain J. Bartlett, who was appointed Inspector of Explosives in this Department on 1st January 1900. Captain Bartlett was taken ill with dysentery while touring in the Madras Presidency, and went into the General Hospital, Madras, on the 19th September 1905. He was operated on for abscess of the liver, and succumbed a few days after on the 16th October at the age of 54. Captain Bartlett was a very hardworking, zealous officer with considerable tact, and carried out his duties most satisfactorily. He was a man of fine physique but there is no doubt that continuous travelling and climatic changes had undermined his constitution. Honorary Lieutenant J. W. Turner, Head Overseer, Proof Department, Balasore, was appointed Inspector of Explosives *vice* Captain Bartlett on the 11th December 1905.

Number of magazines.

3. During the year 1905, 108 licenses (three more than in the previous year) were granted in British India under rule 17 of the Rules to regulate the manufacture, possession and sale of explosives. The number of magazines licensed was 154, four more than in 1905, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines under one license. A statement showing the number and location of the magazines, and also the number of licenses granted in British India is given in Appendix A. It will be seen from this statement how widely dispersed these magazines are, and consequently how much time has to be spent in getting from place to place, which necessarily, to a certain extent, curtails the number of inspections that can be made during the year.

Inspection of explosives magazines during the year.

4. During the year 237 inspections of magazines were made, a number of magazines being inspected two or three times each. Those magazines are inspected most frequently which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives or any explosive, which, on account of greater susceptibility to decomposition and consequent ignition, it is considered advisable to examine and test more than other explosives. The Roburite Factory at Karachi was also inspected once. In addition to these inspections a number of registered premises were visited. A less number of

inspections of magazines was made than in the previous year, partly owing to the fact that the vacancy created by Captain Bartlett's death was not filled up for some time, and partly because considerably more visits were made to petroleum installations this year than last. Most of the small magazines in the coal districts of Bengal are in such good condition now that I do not consider it is necessary to have them inspected more than once a year, more especially as the large feeder magazines, which supply them, are inspected two or three times a year. Moreover, as stated in paragraph 11 of my Annual Report of last year, I had found some of the small oil installations near Railway Stations in such an undesirable state last year that I thought it was advisable for the Inspector of Explosives and myself to inspect as many of them this year as possible. After an experience of seven and a half years in my present appointment I can safely say that till an inspection of explosives magazines or petroleum installations has been made by this Department, it is quite unusual to find the rules or conditions of a license either observed or enforced. Cases have also occurred where petroleum installations have been in existence without any license, till the matter was brought to notice by this Department.

Condition of magazines.

5. The magazines generally are in good order, and, as usual, I have found magazine owners most willing to carry out my recommendations even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

Condition of explosives in magazines.

6. The physical condition of all the explosives in the different magazines during the year was found to be good with the following exceptions. Some 335 lbs. of dynamite in the Railway Magazine at Bina, which had been in stock for a number of years, were showing signs of exudation, and were consequently destroyed, also 35,900 damaged detonators and 4,145 coils of safety fuse, both belonging to Messrs. Angus & Co., Madras, the latter of which had been over five years in stock and had deteriorated, were destroyed under my orders. None of the samples of explosives, taken at inspections, failed to pass the tests laid down, which were carried out as usual by the Chemical Examiners at Calcutta, Bombay, Madras and Rangoon and also by the testing officer at Karachi.

Theft.

7. During the year one case of theft of explosives was reported from the magazine of Messrs. F. F. Chrestien & Co. at Barakura in the Hazaribagh District, Bengal, in which 15 lbs. dynamite—the whole stock of dynamite at the time—700 detonators and 250 coils of fuse were removed. The thieves broke off the padlocks from all four doors during the night, and evidently made a systematic search for the explosives they required, as several burnt matches were found on the floor close to open barrels of gunpowder. It was just a chance therefore that they did not pay a fatal penalty for their daring.

Number of petroleum installations.

8. During the year under report, 308 licenses for the storage of non-dangerous petroleum, with which this Department was concerned, were granted. A list of these installations, corrected up to date and showing the districts in which they are located, is given in Appendix B.

Inspection of petroleum installations during the year.

9. During the year I personally visited the large bulk oil installations at Madras, Bombay, Karachi, Tuticorin, Calcutta (Budge-Budge and Narculdanga), Chittagong and Rangoon and also the oil fields and refineries in Assam and Burma, and a number of the minor installations were also inspected by the Inspector of Explosives and myself. In all 148 inspections were made. As I found it was impossible for me with only one Inspector under me to arrange during a year for the inspection of all the petroleum installations as well as the explosives magazines, I applied for the services of another Inspector to enable me to do so. The Government of India, however, were inclined to think that, if District Magistrates were supplied with clear and precise instructions as to the points to which attention should be directed, they could possibly inspect all minor installations efficiently and thereby obviate the necessity for a considerable amount of work which is petty in itself and which occupies a large amount of time owing to the fact that minor installations are frequently situated in somewhat inaccessible places. I accordingly drew up a list of general instructions, which I endeavoured to make as simple as possible, to guide District Magistrates in making their inspections, and also a report form to be filled up and sent to me after an inspection. These

were circulated to local Governments for necessary action and are reproduced in Appendices C and D.

Condition of large installations.

10. The large installations are usually under European supervision and are generally well looked after, although in the older installations the tanks are very much closer to each other and to other buildings than would now be allowed. Some of these installations have been in existence for many years without any accident, and, although I personally from a safety point of view would like to see some of the large tanks I have come across at a greater distance from buildings than they are, it is a difficult matter to interfere with arrangements that have been in existence for a long time unless a Municipality or Port Trust can offer suitable land elsewhere or in some way help the firms concerned. At Budge-Budge near Calcutta where there is ground available for extension, considerable progress has been made under the superintendence of the Calcutta Port Commissioners in the work of moving the storage tanks and placing them a hundred feet away from one another with an earth bund round each one. When the work has been completed, the installations at Budge-Budge should be very safe. In Bombay, ground in an isolated place near Sewri has been allotted by the Bombay Port Trust to the different oil firms, who have tanks at Mody Bay, where the new docks are in course of construction. In due course all the tanks will be moved to this new site and two large tanks, belonging to the Asiatic Petroleum Company, have already been floated and towed to their new destination.

New large bulk oil installations.

11. Two large bulk oil installations, one belonging to the Burma Oil Company, the other to the Standard Oil Company have been constructed at Karachi. At Madras the Burma Oil Company have built a large installation on the sandy accretion south of the harbour and are about to carry out further extensions. The plans of all these installations, which started work during the year, were submitted to me for approval before being sanctioned. The Standard Oil Company have also applied for a license for a large bulk oil tank at Royapuram, Madras. The Asiatic Petroleum Company will, I believe, also be shortly erecting an installation at Madras.

Condition of small bulk oil installations.

12. The small or minor installations are installations in which not more than 50,000 gallons of kerosine oil are stored, and are generally looked after by native agents, employed by the large oil firms. In last year's report I had to refer to the very undesirable condition of some of these installations. I issued a circular letter to the oil firms, pointing out the most dangerous defects I had noticed in my inspections, and asked them to help me by getting them remedied. The result of their co-operation and of the considerable amount of petroleum inspection work done by this Department has been that a decided improvement in the condition of these installations has been effected.

Accidents.

13. No accidents have occurred in the magazines or in the one explosives factory (Roburite Factory at Karachi) licensed in this country. A list of other accidents by fire or explosions that have occurred with explosives, inflammable substances, dangerous chemicals, etc., between the 1st January 1905 and the 31st December 1905, and that have been brought to the notice of this Department, is given in Appendix E, and gives a short account of each one. It will be seen from a perusal of the details that the accidents have practically all been caused by gross carelessness or through neglect of ordinary precautions. In all there were forty-four accidents causing thirty-two deaths and injuries to sixty-one. Comparative statements given in Appendices F and G show the total number of accidents and the number of persons killed and injured by them during the six years from 1900 to 1905.

Gunpowder.

14. There were seven gunpowder accidents during the year, causing the death of six persons and injuries to three. This is a considerable improvement on any preceding year.

Dynamite.

15. Dynamite (ten accidents) was responsible for six deaths and injuries to nineteen persons. Seven of these accidents occurred in blasting operations in connection with the construction of the Gaya-Khatras Railway and can only be looked upon as prevent-

able accidents, which probably would not have taken place if the precautions recommended in paragraph 9 of my fifth Annual Report had been duly observed. The frequency of these accidents caused a reference to be made to me on the subject by the Government of Bengal. The rules laid down for blasting operations on the Gaya-Khatras Railway have been examined and added to and steps have been taken to ensure that they shall be observed in future.

Fireworks.

16. Fifteen accidents from fireworks have been reported to this Department, causing thirteen deaths and injuries to twenty-six persons. Fireworks have supplied the largest casualty list during the year. Most of the accidents are caused by the Sulphur Chlorate combination of fireworks, which are prohibited in England, but which the Government of India after due consideration of all the points at issue, decided not to prohibit in India.

Petroleum.

17. There were twelve accidents from petroleum reported during the year which were responsible for seven deaths and injuries to thirteen. A slight explosion (Index No. 34 in the list of accidents) took place in a tank belonging to the Asiatic Petroleum Company at Budge-Budge on the 15th April 1905, which was the subject of a special enquiry and report by the Chief Inspector of Explosives. The most likely reason for the accident appeared to be that it was due to a spark caused by vapour pressure rupturing part of the tank owing to the ventilators being closed while oil was being pumped into the tank from an oil steamer. The explosion occurred just at the end of this operation. The direct evidence of the Manager and other employés did not, however, support this view and consequently other possibilities had to be considered, but there were no actual data from which to form a definite conclusion. As a result of the enquiry, I thought it advisable to address all the oil firms, advising them (1) to keep the ventilators in oil tanks always open, and (2) to carefully examine the foundations of their tanks from time to time in order to detect and remedy any subsidence that might occur. Two accidents (Index Nos. 39 and 40), which luckily did not turn out as serious as they might have been, occurred in Bombay Harbour during the transport of petrol by boat. The question of measures to stop accidents of this kind are under the consideration of the Bombay Port Trust, who have been in communication with me on the subject. The accidents reported this year show clearly the danger of bringing lights anywhere near petroleum vapour and demonstrate also the travelling power of that vapour. Petroleum should always be stored by itself and never in conjunction with explosives, inflammable substances or dangerous chemicals. Mixed storage of this sort caused a fire (Index No. 43) in a dangerous petroleum godown at Bombay owing to the spontaneous ignition of some phosphorus which was stored in the same place. Only lately I had to call the attention of the local authorities to a certain godown, where about 4,000 tins of kerosine and cotton and jute were all crammed together in the same room. Oily cotton and jute are very susceptible to spontaneous ignition, so that such storage is extremely dangerous and may lead to a large conflagration in a crowded area.

Government accidents.

18. Three Government accidents were reported to this Department during the year and the details are given in Appendix H. One of them was a very serious one, and occurred in the Quetta Arsenal, where a European Sergeant and four lascars lost their lives by an explosion while emptying a 6·3 inch Howitzer Common Shell. A Board of Enquiry was held and found that no blame could be attached as none of the precautions laid down appeared to have been neglected, but the Board was of opinion that the primers of shells used by heavy ordnance should be damped before being extracted from the shells.

Import of explosives.

19. One thousand four hundred and seventy tons of explosives were imported into British India during the year 1905, the value being Rs. 15,24,619. Full details showing the different kinds of explosives imported during the year, and the value of each, is given in Appendix I. A comparative statement showing the import of explosives during the five years 1901 to 1905 is given in Appendix J.

Import of petroleum.

20. During the year 1905, 88,972 gallons of dangerous petroleum and 70,110,251 gallons of non-dangerous petroleum were imported by sea into British India. The details are

given in Appendix K, and also the amounts of dangerous and non-dangerous petroleum produced in Assam and Burma during the year. In Appendix L, I also give an interesting statement, culled from the "Petroleum Review," dated 24th February 1906, showing the production of petroleum in the respective petroleum producing countries during the past three years. It will be seen that the production in India has risen from 325,400 tons to 465,000 tons.

21. Some points of interest in connection with the work done by this Department during the year are mentioned below :—

(*a*) The criticisms on the draft consolidated explosives rules for the manufacture, possession and sale of explosives have now been received by the Government of India and are under consideration, so that I hope these rules will be finally issued in a short time.

Explosives Rules.

(*b*) The Rules for the transport and importation of explosives have been amended during the year by the introduction of new and simpler rules for the packing of explosives, similar to those adopted in England. This amendment is given in Appendix M.

Packing of explosives.

(*c*) A list of explosives authorised for importation into British India for general sale, revised and corrected up to March 1906, is given in Appendix N.

List of authorised explosives.

(*d*) A rule forbidding the carriage of explosives over railway bridges, except under certain circumstances, was added during the year to the rules regulating the transport and importation of explosives—*vide* Government of India Notification given in Appendix O.

Carriage of explosives over railway bridges.

(*e*) A new notification laying down when picric acid is to be considered an explosive, will be found in Appendix P.

Picric acid.

(*f*) The rules for the transport and importation of explosives, together with those for testing explosives, are being brought up to date, and are at present under the consideration of the Government of India.

Import, transport, and testing of explosives.

(*g*) The draft consolidated petroleum rules will, it is believed, be shortly issued for criticism. Unforeseen difficulties have prevented these rules being circulated earlier, but abstracts of the rules affecting the storage of petroleum have been circulated by the Government of India.

Petroleum Rules.

(*h*) As I found that dangerous petroleum was being imported into India in kerosine tins inside wood cases and considered this dangerous, I brought the matter to the notice of the Government of India, who ruled that this procedure was to be prohibited and that dangerous petroleum must be packed only in the receptacles permitted by the rules for the storage of dangerous petroleum in this country.

Importation of dangerous petroleum in kerosine tins.

(*i*) The consolidated carbide of calcium rules have now been finally issued to local Governments for adoption. All recent changes in the English rules have been introduced into them.

Carbide of Calcium Rules.

(*j*) As the rules stand at present, the inside packing of boxes containing Sulphuric and Hydrochloric acids has to be of ashes free from cinders, or of chalk, sand or dry earth, and an application was received suggesting that straw should be substituted as a packing medium. I could not recommend the change proposed, which accordingly was not carried out.

Packing of acids.

(*k*) I was addressed during the year by the Commandant, 3rd Sappers and Miners, who desired my opinion as to the time fulminate of mercury detonators

Fulminate of Mercury detonators.

would keep in this country without deterioration :—

(i) when stored in an ordinary dwelling house,

(ii) when stored in an ordinary magazine,

and as to whether, when deterioration (loss of explosive strength) set in, the process would be probably general or whether some of the detonators would be likely to deteriorate more rapidly than others. As the questions asked are of some considerable importance affecting as they do the lives of those carrying out blasting operations, I think it as well to publish the substance of my reply as the information may be of some interest and use to the general public. I gave it as my opinion that these detonators should not ordinarily deteriorate within a period of five years in India if kept in a dry place whether in an ordinary dwelling house or in an ordinary magazine, but I considered that after five years' storage 5 per cent. of the stock should be tested by firing, and, even if found good, fresh tests should continue to be taken every two years. I also considered that deterioration, if it took place, would be usually general if the detonators were exposed to the same conditions and that the testing I suggested should be sufficient to bring to light any such deterioration. I also presumed that in actual practice the oldest stock was always issued first to prevent as far as possible the accumulation of old stock. In connection with this subject I would draw attention to para. 10 of my fourth Annual Report where I dealt with the question of the deterioration of safety fuze in this country and the possibility of accidents being caused thereby.

(*l*) This Department was consulted during the year regarding the packing necessary for anhydrous ammonia, which is compressed ammonia gas. Only a short time ago rules for the packing of carbonic acid gas were drafted by this Department and, when this reference was received, I recommended that instead of drafting rules for the packing of each kind of compressed gas, as it became introduced into India, it would be desirable to alter the Railway rules so that under a general heading "Compressed Gas," all possible kinds of compressed gases should be given, and one set of packing rules placed opposite, which should be sufficient for any particular case, as shown in Appendix Q.

Anhydrous Ammonia.

(*m*) The Port Trusts of Calcutta, Bombay, Madras and Karachi have been addressed by this Department regarding the advisability of providing spark protectors for Railway engines passing in close proximity to large bulk oil installations, and I believe steps have been taken to carry out the recommendations.

Spark protectors.

(*n*) The work of this Department keeps on increasing rapidly, more especially as regards consultation work, and this chiefly in connection with the petroleum industry. In fact, I may safely say that three-fourths of the work is occasioned by references about petroleum.

Work of the Department.

I have the honour to be,

SIR,

Your most obedient Servant,

C. A. MUSPRATT-WILLIAMS,

Major, R.A.,

Chief Inspector of Explosives.

APPENDIX A.

List of Magazines and Licenses granted under Rule 17 of the Explosives Rules for the year 1905.

Province or Presidency.	District.	Magazines			Licenses		
		Under renewed license.	Under new license.	Total.	Renewed.	New.	Total.
Bengal	Burdwan	18	3	21	15	3	18
	Darjeeling	3	...	3	3	...	3
	Gaya	7	...	7	5	...	5
	Hazaribagh	13	...	13	11	...	11
	Hooghly	4	...	4	1	...	1
	Manbhum	14	1	15	12	1	13
	24-Parganas	...	1	1	...	1	1
	Total	59	5	64	47	5	52
Bombay	Ahmedabad	...	2	2	...	2	2
	Bombay	15	1	16	9	1	10
	Karachi*	8	1	9	4	1	5
	Kolaba	...	2	2	...	1	1
	Total	23	6	29	13	5	18
Burma	Mergui	1	...	1	1	...	1
	Ruby Mines	1	...	1	1	...	1
	Hanthawaddy	2	1	3	1	1	2
	Total	4	1	5	3	1	4
Central Provinces	Jubbulpur	3	...	3	2	...	2
	Nagpur	3	...	3	2	...	2
	Raipur	4	...	4	4	...	4
	Saugor	1	...	1	1	...	1
	Total	11	...	11	9	...	9
Eastern Bengal and Assam	Cachar	1	...	1	1	...	1
	Lakhimpur	1	...	1	1	...	1
	Total	2	...	2	2	...	2
Madras	Chingleput	...	2	2	...	1	1
	Godaveri	4	...	4	2	...	2
	Madras	17	...	17	4	...	4
	Nellore	4	...	4	2	...	2
	The Nilgiris	4	...	4	2	...	2
	Tanjore	...	1	1	...	1	1
	Vizagapatam	4	...	4	2	...	2
	Total	33	3	36	12	2	14
United Provinces	Cawnpore	2	...	2	2	...	2
	Dehra Dun	1	...	1	1	...	1
	Gharwhal	1	...	1	1	...	1
	Lucknow	1	...	1	1	...	1
	Meerut	1	...	1	3	...	3
	Shahjehanpur	1	...	1	1	...	1
	Total	7	...	7	9	...	9
SUMMARY.							
Bengal		59	5	64	47	5	52
Bombay		23	6	29	13	5	18
Burma		4	1	5	3	1	4
Central Provinces		11	...	11	9	...	9
Eastern Bengal and Assam		2	...	2	2	...	2
Madras		33	3	36	12	2	14
United Provinces		7	...	7	9	...	9
	Grand Total	139	15	154	95	13	108

* At Karachi there is in addition a Roburite Factory licensed under Rule 12.

APPENDIX B.

List of non-dangerous petroleum installations licensed during the year 1905.

Province.	District.	No.
Ajmer-Merwara	Ajmer	3
	TOTAL	3
Bengal	Balasore	2
	Bhagulpur	5
	Birbhum	2
	Burdwan	7
	Calcutta	3
	Champaran	2
	Chapra	1
	Cuttack	1
	Darbhanga	4
	Gaya	4
	Khulna	1
	Manbhum	1
	Midnapur	1
	Monghyr	4
	Mozufferpur	6
	Murshedabad	1
	Palamau	1
	Patna	4
	Purnea	1
	Purulia	1
	Ranaghat	2
	Sambalpur	2
	Santal Parganas	3
	Shahabad	2
	24-Parganas	6
	TOTAL	67
Bombay	Ahmedabad	6
	Ahmednagar	2
	Belgaum	3
	Bijapur	4
	Bombay	3
	Broach	4
	Dharwar	8
	Karachi	7
	Khandesh	6
Bombay—*contd.*	Kholapur	2
	Nasik	5
	Poona	3
	Satara	2
	Sholapur	4
	Surat	4
	Thana	2
	TOTAL	65
Burma	Hanthawaddy	3
	Mergui	3
	Mingyan	1
	Pokoku	3
	TOTAL	10
Central Provinces	Akola	8
	Amraoti	6
	Bhandara	3
	Bilaspur	1
	Buldana	3
	Chanda	1
	Hoshangabad	2
	Jubbulpur	5
	Nagpur	3
	Narsinghpur	2
	Nimar	6
	Raipur	1
	Saugor	3
	Sutna	1
	Wardha	4
	TOTAL	49
Eastern Bengal and Assam	Backerganj	2
	Bogra	1
	Chittagong	2
	Jalpaiguri	1
	Mymensingh	1
	Pabna	2

Province.	District.	No.
Eastern Bengal and Assam —*contd.*	Rungpur	1
	Sylhet	1
	TOTAL	11
Madras	Anantapur	2
	Bellary	2
	Chingleput	1
	Coimbatore	4
	Cuddapah	1
	Ganjam	3
	Godavery	2
	Guntur	1
	Kistna	1
	Kurnool	1
	Madras	3
	Madura	2
	Malabar	3
	Nellore	3
	North Arcot	1
	Salem	2
	Shoranor	1
	South Arcot	5
	Tanjore	6
	Tinnevelly	3
	Trichinopoly	1
	Vizianagram	1
	TOTAL	49
N.-W. Frontier Province	Peshawar	1
	TOTAL	1
Punjab	Delhi	3
	Jullunder	1
	Lahore	2
	Ludhiana	1
	Umballa	2
	TOTAL	9
United Provinces	Agra	3
	Aligarh	1
	Allahabad	3
	Azamgarh	1
	Bahraich	1
	Bara Banki	1
	Bareilly	2
	Basti	1
	Benares	4
	Cawnpur	2
	Dehra Dun	1
	Etawah	1
	Fyzabad	2
	Ghazipur	1
	Gonda	2
	Gorakpur	2
	Jaunpur	1
	Jhansi	3
	Lucknow	4
	Meerut	1
	Mirzapur	1
	Moradabad	2
	Muttra	1
	Saharanpur	1
	Shahjehanpur	2
	TOTAL	44

SUMMARY.

AJMER-MERWARA	3
BENGAL	67
BOMBAY	65
BURMA	10
CENTRAL PROVINCES	40
EASTERN BENGAL AND ASSAM	11
MADRAS	49
N.-W. FRONTIER PROVINCE	1
PUNJAB	9
UNITED PROVINCES	44
TOTAL	308

APPENDIX C.

Instructions for the guidance of District Magistrates in making inspections of minor installations.

1. A "minor installation" means an installation—
   (*a*) capable of containing an amount of oil, whether in bulk only or in combined bulk and non-bulk storage, not exceeding 50,000 gallons, and
   (*b*) in which no tin making operations are carried on.

2. "Petroleum in bulk" means quantities of 500 gallons or upwards contained in any one tank or receptacle.

3. "Petroleum in non-bulk" is petroleum in tins, cases or drums.

4. No smoking is to be allowed in the installation.

5. All operations within the installation are to be under the supervision of a responsible agent or supervisor.

6. The ground inside the installation must be kept clean and free from goods of a dangerous nature and from vegetation and rubbish.

7. A supply of sand in buckets or other receptacles should always be kept inside the installation to extinguish fires.

8. Where there are any enclosure walls or embankments to an installation, it is necessary to ascertain that they are in good order and that all the oil licensed to be stored within them can be efficiently contained without overflow in case of its escape from the containing vessels. Certificates to this effect, signed by Civil Engineers, are laid down in the rules as necessary.

9. The capacity in gallons of every tank and storage shed should be conspicuously marked on it.

10. Where a lightning conductor is necessary under the Rules, it must be tested once a year, and a certificate showing the date of last test must be posted up in a conspicuous place in the installation.

11. No installation must be open or work permitted between sunset and sunrise.

12. Where there are any pipes or openings in enclosure walls for drainage purposes, arrangements must be made whereby they can be closed and they should only be allowed to be kept open when actually required for draining.

13. All sheds or godowns for the storage of oil in tins, drums or cases must be built of uninflammable material.

14. In a minor installation there is usually one tank, a filling and storing shed, a soldering shed, and possibly a watchman's hut. In some installations an enclosure wall surrounds the whole installation; in others, the tank only is surrounded by a wall to contain the oil if it should escape from the tank, and the floors of the godowns or sheds are sunk or the walls raised to form a tank so as to contain the oil stored in case of its escape. It is necessary to see that in case of accident the oil can be efficiently contained without overflow, whatever the method adopted for this purpose. For purposes of calculation, a cubic foot of vacant space may be regarded as able to contain 6·25 gallons.

15. The distances laid down in the rules to be kept clear between a tank and the walls or embankments which surround it must be observed for all future installations. This also applies to the height of walls and embankments.

16. The distances laid down in the rules to be kept clear round an installation, must be observed for all new installations. In case of installations, which have been in existence previous to the issue of these rules, it may not be possible to insist rigidly on these distances, but they should not be allowed to be invaded further in the future.

17. Not more than 400 cases of oil in addition to tins and drums is allowed to be stored in any installation.

18. Soldering must not be allowed in the filling shed or close to the tank.

19. No fire or lights, except those necessary in the soldering room and watchman's hut, must be allowed.

C. A. MUSPRATT-WILLIAMS,
Major, R.A.,
Chief Inspector of Explosives with the Govt. of India.

APPENDIX D.

DISTRICT.

Report on the petroleum installation of_____at_____

Licensed for the storage of_____gallons non-dangerous oil in tank (s).

_____gallons non-dangerous in tins or drums,

_____gallons non-dangerous in cases.

Local Agents or Manager_____

1. By whom inspected	
2. Date of inspection	
3. Of what buildings does the installation consist . .	
4. Is the whole installation surrounded by a suitable wall within which all the oil licensed to be stored can be contained. If not, what arrangements exist for the purpose and are they sufficient.	
5. Is the capacity in gallons of the tanks and storage shed marked on them.	
6. What distance is the installation from any other installations or buildings.	
7. What distance are the walls surrounding the tank from the tank itself.	
8. What is the height of the enclosure wall, if any . .	
9. Are the tanks and connecting pipes leaking . .	
10. State the number of cases of oil in stock at the time of visit.	
11. State the number of tins or drums in stock at the time of visit.	
12. State the number of tins or drums of oil stored in the soldering shed.	
13. Is any soldering done in the filling shed or elsewhere than in the soldering shed. If so, where.	
14. Is work carried on between sunset and sunrise . .	
15. Are there any fires or lights, except those allowed in the soldering and watchman's house, near the tanks or filling shed.	
16. Are goods of a combustible nature kept within the installation.	

17. Has the installation a lightning conductor . . .

18. If so, when was it last tested . . . . .

19. Are there any drainage pipes and are they securely closed when not in use.

20. Have the storing, filling and soldering sheds any inflammable material in their construction.

21. Is sand kept in the filling and soldering sheds . . .

22. Is the installation clean and free from vegetation, rubbish, etc.

23. Are the general rules, copy of license, and lightning conductor test certificate hung up in the installation.

24. General remarks or suggestions . . . .

APPENDIX E.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1905 to 31st December 1905.

No.	Date of accident.	Nature of explosives.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Explosives.			
1	25th Feb. 1905.	Gunpowder	Vengayankuppan, South Arcot.	The District Magistrate reported that a licensee spread out about 3 pounds of gunpowder in the inner courtyard of his house to dry in the sun. He took a small quantity a short distance away and set fire to it to see whether it would burn. The larger quantity in the yard caught fire from a spark and exploded, causing the death of the licensee and injuring another man.	1	1
2	10th April 1905	Powder	Devanur, South Arcot.	The Magistrate reported that while a native was warming some powder in a pan over some fire in the verandah of a thatched house there was a sudden explosion which caused the destruction of about 20 houses in the settlement. No lives, however, were lost. The man was prosecuted for his negligent conduct and sentenced to 2 months' rigorous imprisonment.	...	...
3	30th June 1905	Gunpowder	Gogai, Salem	The Magistrate of Salem reported that three holes had been made in a well for blasting. Two of them had been charged with gunpowder while the third was being rammed with an iron rammer and hammer. An explosion occurred caused by a spark, which ignited some powder near the hole, causing the death of the man carrying on the operations.	1	...
4	26th July 1905.	Gunpowder	Coimbatore	The Magistrate reported that as two men were making gunpowder there was an explosion owing to the wooden pestle being used too violently in the mortar, which was also made of wood.	1	1
5	8th Oct. 1905	Gunpowder	Kotri	The Inspector, Railway Police, reported that while a gentleman was letting off fireworks, a spark from them apparently fell into a tin of gunpowder which a servant was holding near by, although he had been warned to take it away. An explosion occurred, fatally injuring the servant.	1	...
6	12th Nov. 1905.	Gunpowder	Rawalpindi	The Sub-Inspector of Police reported that 25 maunds of country gunpowder which was stored in a building exploded. The accident was due to a native who is said to have been smoking in the building.	1	...
7	25th Dec. 1905.	Gunpowder	Madras	The Commissioner of Police reported that while two natives were pounding a mixture of saltpetre, charcoal and sulphur, the charge exploded and injured both of them, and one of them succumbed to his injuries.	1	1
				TOTAL	6	3
8	5th Jan. 1905	Dynamite	Tunnel of the Gaya-Khatras Railway.	The Magistrate of Gaya reported that while a hole for blasting was being drilled near an unexploded charge of dynamite, the charge exploded.	1	1
9	7th Feb. 1905	Dynamite	Tunnel of the Gaya-Khatras Railway.	The Magistrate of Gaya reported that during blasting operations there were five misfires of which only four were traced, and it is presumed that the injured men found the other hole in which the unexploded charge was and, taking advantage of the fact that they were being paid by the number of holes drilled, started work on the hole with the result that the unexploded charge suddenly exploded, injuring the two men.	...	2
10	11th April 1905.	Dynamite	Tunnel No. 1, Gaya-Khatras Railway.	The Magistrate of Gaya reported that a new blasting hole was being drilled about 2 feet away from a charge, which had misfired on the same day, when an explosion occurred by which one man lost his life and another was seriously injured.	1	1
11	18th April 1905	Dynamite	Patwas, Gaya-Khatras Railway.	The Magistrate of Gaya reported that two men were drilling in some blast hole which had evidently misfired some days previously, when the charge suddenly exploded.	1	1

No.	Date of accident.	Nature of explosives.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
				Explosives—*contd.*		
12	9th May 1905	Dynamite	Tunnel No. 11, Gaya-Khatras Railway.	The Magistrate reported that on the morning of the accident 27 shots were fired in three lots. One misfire was noticed and successfully refired. While two coolies were removing the loosened rock, it is presumed that one of them came across a portion of a partly exploded charge probably of a former blast, which exploded and injured them both.	2	...
13	11th May 1905	Dynamite	Gaya-Khatras Railway.	The Engineer in Charge, Gaya-Khatras Railway, reported that after clearing away the *débris* caused by a previous blast, the men proceeded to bore new holes and it appeared that an unexploded hole got covered with the *debris* and without noticing this, two men commenced boring close to an old hole slantwise and after going down a little way the end of the jumper touched the unexploded cartridge and fired it, resulting in injuries to five men.	...	5
14	30th June 1905	Dynamite	Burma Ruby Mines.	The District Magistrate, Burma Ruby Mines District, stated that during drilling operations for blasting in a tunnel an explosion occurred by which one man was so badly injured that he died shortly after and another was injured. The Magistrate was of opinion after visiting the scene of the accident that the accident occurred owing to a man drilling into the base of an old blast hole which must have had some small amount of dynamite left in it unexploded.	1	1
15	7th August 1905	Dynamite	Gaya-Khatras Railway.	The Magistrate of Gaya reported that five blast holes were charged and fired by coolies. Only three charges appeared to have exploded, and after waiting 8 or 10 minutes the coolies went to examine the place and when they were within 17 feet of the holes one of the charges exploded injuring both men.	...	2
16	20th Sep. 1905	Dynamite	Mogok	During drilling operations for blasting in the Taraktan mine, an explosion occurred due to boring into an old bore hole where there was evidently some unexploded dynamite.	...	4
17	23rd Dec. 1905	Dynamite	South Coorg	The Executive Engineer, Coorg Division reported that during blasting operations two coolies were injured, owing to working on a hole in which one of the old charges must have been left unexploded.	...	2
				TOTAL	6	19
18	7th Feb. 1905	Fireworks. A bomb composed of potassium chlorate and red arsenic.	Calcutta	The Commissioner of Police, Calcutta, reported that a native set fire to a bomb with a match and it exploded injuring 7 men who were near, one of whom subsequently succumbed to injuries received.	1	6
19	7th March 1905	Fireworks consisting of potassium chlorate and red arsenic.	Hazipur, Noakhali	The Magistrate of Noakhali reported that, while three natives were manufacturing fireworks, the firework composition suddenly caught fire and the three men were seriously burnt, one of them succumbing to his injuries.	1	2
20	8th April 1905	Fireworks consisting of nitrate of baryium and nitrate of strontium, sulphur, lamp black, sticklac and chlorate.	Pattukkottai, Tanjore.	The Magistrate reported that a native with the assistance of four others was making fireworks. While the ingredients were being pressed into a receptacle, they took fire and exploded. The five men were killed and a woman, who was near by, was injured.	5	1
21	28th May 1905	Fireworks consisting of sulphur, saltpetre charcoal and sulphide of arsenic.	Tirutturaipundi	The Magistrate reported that a native, the servant of a license holder, took a firework and made a hole in it to put in gunpowder and a wick, and rammed the powder with a stick. During the process of ramming, the firework took fire, and was thrown down with the result that the other fireworks in the hut caught fire. It appears that the licensee was manufacturing gunpowder in a hut set apart for storage only and he was prosecuted, fined and his license cancelled.	...	2
22	18th June 1905	Fireworks consisting of red arsenic and potassium chlorate.	Chanda	The District Magistrate reported that while some of the composition was being rammed into a barrel, it exploded injuring two lads, one of whom subsequently died and also injuring the boy who was ramming the charge. Some sparks from the explosion fell on some potassium chlorate which a third youth was holding in his hand and caused its explosion with the result that his hand was blown off.	1	3

No.	Date of accident.	Nature of explosives or oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
			Explosives—*concld.*			
23	12th Sep. 1905	Fireworks consisting of chlorate of potash, sulphide of arsenic, chlorates, sulphates and nitrates.	Entally, Calcutta	The Commissioner of Police reported that a native who had no license to manufacture or possess fireworks was preparing some bombs, when from some cause or another an explosion occurred whereby he was injured and removed to hospital but died shorty after admission. The scrapings from the floor were sent to the Chemical Examiner to Government who found them to contain the chemicals mentioned in column 3.	1	...
24	1st October 1905	Fireworks consisting of chlorate of potash and sulphide of arsenic.	Calcutta	The Commissioner of Police, Calcutta, reported that, while a native was preparing fireworks and was stirring the two mixtures with a knife in a piece of paper, the mixture exploded burning him severely.	...	1
25	8th Oct. 1905	Fireworks consisting of chlorate of potash and momchal.	Balliaghatta	The Inspector of Police reported that while a native was mixing the two ingredients, an explosion occurred injuring him severely.	...	1
26	10th Oct. 1905	Fireworks consisting of sulphide of antimony and chlorate of potash.	Tanjore	The Magistrate reported that a native lad was preparing small bombs and was grinding the ingredients on a stone when they exploded killing him on the spot.	1	...
27	27th Oct. 1905	Fireworks consisting of chlorate of potash and sulphide of antimony.	Calcutta	The Commissioner of Police reported that, whilst two native women were making fireworks, one of the fireworks fell out of the hands of one of the women into a small tin box containing a mixture of the explosives and exploded injuring both women and four children who were near by, one of whom died subsequently.	1	5
28	27th Oct. 1905	Cracker consisting of sulphur and chlorate of potash.	Calcutta	The Superintendent of Police reported that while a native was dragging down a bag of grain from the top of a heap of grain bags, it dropped down on to the floor and on a cracker which was not noticed, with the result that the cracker exploded injuring the cooly. How the cracker got into the godown could not be ascertained.	...	1
29	27th Oct. 1905	Cracker consisting of chlorate of potash and sulphide of antimony.	Dharmapuri, Salem	The Magistrate reported that a native was amusing his child by lighting fireworks, and sparks fell on some crackers, and an explosion occurred causing him such injuries that he died.	1	...
30	28th Oct. 1905	Fireworks consisting of chlorate of potash and sulphide of arsenic.	Calcutta	The Commissioner of Police reported that a native was breaking up two of the fireworks to make them into a large one when they exploded injuring him.	...	1
31	8th Nov. 1905	Fireworks consisting of sulphur, chlorate of potash, charcoal, iron and steel filings.	Bombay	The Commissioner of Police reported that some loose ingredients were swept up from a room inside a house and spread out in the sun to dry. A woman took the ingredients and was pounding them in a mortar when they exploded injuring her so severely that she succumbed from the effects the next day.	1	...
32	25th Nov. 1905	Fireworks consisting of chlorate of potash, red arsenic and sand.	Bombay	The Commissioner of Police reported that while a native was mixing the ingredients between two stones, they exploded injuring the man and three women who were near by.	...	3
				TOTAL	13	26
			Petroleum.			
33	9th Feb. 1905	Petrol	Calcutta	The Commissioner of Police, Calcutta, reported that about 8 P.M. a motor car was being filled with petrol by means of a tin can, while the petrol drum was placed on the left step of the car and a native was holding a lamp about a yard away, when suddenly a flame shot up from the tank caught the tin can and then shot across to the petrol drum and there was a general blaze. The owner of the machine and his chauffeur were injured and also a horse which was in some stables near by which caught fire. The horse had to be shot. The car was slightly burnt.	...	2

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
				Petroleum—*contd.*		
34	15th April 1905 .	Petroleum .	Budge-Budge .	At about 9·20 A.M. there was a slight explosion at No. 9 tank belonging to the Asiatic Petroleum Company. The Superintendent, Petroleum Wharf, who was close by at the time, saw part of the roof of the tank raised, and a rush of flame issuing. The roof appears then to have fallen back and dense smoke took the place of the flames. No one was hurt and the extent of damage done was only Rs. 1,600. The adjoining tank, which was within a few feet, and contained oil, was not affected. An oil steamer was just finishing pumping oil into the tank at the time of the explosion. A special enquiry was held by the Chief Inspector of Explosives who forwarded a report on the same to the Government of India and the Government of Bengal.	...	...
35	26th June 1905 .	Kerosine .	Lakhipur, Noakhali.	The Magistrate reported that a native child, who was amusing herself by lighting straw at a kerosine lamp near a tin of kerosine oil accidently dropped a lighted straw into the tin, whereupon the oil caught fire with the result that the house was burnt down and three children burnt therein.	3	...
36	27th June 1905 .	Kerosine .	Shidhi, Noakhali .	The Magistrate reported that a native lad allowed a lamp to drop into a tin of kerosine oil with the result that the tin of oil caught fire. The father of the lad tried to take the tin out of the house, but it slipped out of his hands and he was burnt so severely that he died. His son and wife came to his assistance and also received injuries from the burning oil.	1	2
37	29th June 1905 .	Petrol . .	Calcutta . .	The Commissioner of Police reported that about 8-30 P.M. an explosion of petrol took place in the petrol godown of Messrs. Walter Locke & Co. at No. 4, Esplanade East, and is attributed to a leak in one of the drums containing petrol through which the vapour must have escaped and travelled into an adjoining room where there was an enamelling stove which was alight at the time of the explosion and the vapour must have caught fire at it and travelled back to the drum and burst it. There were at the time 25 2-gallon drums in the godown, 18 of which contained petrol but none of these caught fire.	...	...
38	11th July 1905 .	Crude Petroleum	Yenangyaung, Burma.	A slight explosion occurred in one of the Burma Oil Co.'s tanks at about 11-45 P.M. The tank was 19' 6" high and 32' 6" in diameter and had a capacity of 100,000 gallons. At the time of the explosion there was about 17 feet of oil in the tank. There were other tanks containing oil in the vicinity. Oil was run daily from the oil fields into these tanks, and a dip is taken hourly in the day time between 6 A.M. and 6 P.M. while from 6 P.M. and 6 A.M. the tank is hourly visited to see that the oil does not overflow. The man, who died from the injuries caused by the explosion, confessed to his having taken a light to the top of the tank to see how much oil was in it. The damage done was very slight, being estimated at about Rs. 25. One or two of the plates on one side of the tank were buckled and the roof slightly crumpled.	1	...
39	7th Sep. 1905 .	Petrol . .	Bombay Harbour .	The Commissioner of Police reported that a cargo of dangerous petroleum had been unloaded into 4 cargo boats and was being conveyed to the storage building on shore. One of these having loaded about 1,600 drums left for Ismail Habib Bunder about 5-30 P.M., and the tindal of the boat reported that shortly after he heard a noise of something leaking. The lights were lit at about 6-30 P.M. and about 7 P.M. a heavy dull explosion was heard and the boat at once burst into flames and began to drift towards the steamers and craft lying at anchor. The Port Trust tug boat came to the rescue, but finding it impossible to take the boat in tow it was decided to ram her, which proved successful. Patches of burning oil drifted slowly with the tide and the work of extinguising the flames as far as this was possible was begun and by 10 P.M. no trace of floating flames remained. The seven men who were on board jumped over board but two of them were burnt. Two other boats took fire, one of which had 1,011 drums and the other 1,200 drums of dangerous petroleum but both having stuck in the mud on account of low tide, and as nothing	...	2

No.	Date of accident.	Nature of oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of persons	
					Killed.	Injured.
				Petroleum—*concld.*		
				could be done to save them, they were allowed to burn down. The three barges took fire about the same time although there was no connection between the fire on the first barge and that on Nos. 2 and 3. No. 1 was distant at the time some two miles from the others. No. 3 presumably took fire from No. 2 which was only about 12 yards distant to windward. The hour at which the fires occurred is that at which crews generally cook their food and presumably the cause of the fire can be attributed to the petrol vapour catching fire from lights, as the drums were said to be leaking. The drums were all 4-gallon drums.		
40	5th Nov. 1905	Petrol	Jackeria Bunder Bombay Harbour.	An iron barge containing about 2,000 drums was conveying them to the Bunder to land them. Owing to an adverse *tide the barge did not get to the Bunder till dark and so* had to anchor there as by the Customs Rules no petrol is allowed to be landed after dark. Two of the crew went ashore at about 6 P.M. to cook food and returned with the cooked food at about 6-30 P.M. Whilst the crew were eating their food on the front part of the barge a slight explosion took place and the barge was enveloped in flames. The crew jumped over board but the Tindal of the boat got slightly burnt. There is no doubt that the accident must have been caused by some one either striking or bringing a light on or near the barge.	...	1
41	18th Sep. 1905	Petroleum	On *S. S. Oriental* at Rangoon.	From the Magistrate's enquiry it appears that while the steamer was going from Duncedaw to Syriam, a Khalasi struck a light in the ballast hold in the forepart of the steamer where a tin of kerosine oil had been irregularly and presumably dishonestly placed by some person. Vapour had evidently been given off from this oil and accumulated in the confined place of the hold and the mixture of air and vapour exploded when the light was struck and the man died in consequence of the injuries received.	1	...
42	9th Nov 1905	Petroleum	Yenanyaung	A gusher well No. 160 belonging to the Burmah Oil Co. and situated on the brow of a hill caught fire. The fire was caused by lights being used in a Burman's hut about 100 feet away from the well on the downward slope. The gas from the well travelled down to the hut, got lighted there, and the flames flashed back to the well and also set the hut on fire. Four Burmans in the hut were burnt. The fire was put out after some considerable time. The Burma Oil Co. sufferred a loss of about Rs. 7,500.	...	4
43	13th Nov. 1905	Petroleum	Bombay	About 8 o'clock in the evening a fire was discovered in the Port Trust petroleum godown in which were stored paint, benzine, naptha, laughing gas and phosphorus. The cause of the fire was attributed to spontaneous ignition of the phosphorus. The godown was destroyed by the fire.	...	...
44	31st Dec. 1905	Crude earth oil	Rangoon	The Magistrate reported that 3 coolies were engaged in refilling an oil storage tank, the oil being used for the furnace in the bolt machine shop. The men finding the oil congealed and thick, stirred it with a red hot iron bar, when flames burst forth suddenly injuring the men, one of whom died from the effects.	1	2
				TOTAL	7	13

Summary of accidents during the year 1905.

Explosive or dangerous and inflammable substance.	Accidents causing loss of life and bodily injury.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons			
		Killed.	Injured.		
EXPLOSIVES.					
Gunpowder	6	6	3	1	7
Dynamite	10	6	19	...	10
Ammunition	...	...	...	...	...
Fireworks	15	13	26	...	15
TOTAL .	31	25	48	1	32
PETROLEUM.					
Petroleum generally	9	7	13	3	12
TOTAL .	9	7	13	3	12
CHEMICALS.	...	...	...	...	...
TOTAL .	...	...	...	...	...
MISCELLANEOUS.	...	...	...	...	...
TOTAL .	...	...	...	...	...
GRAND TOTAL .	40	32	61	4	44

ENDIX F.

Detailed statement showing the number of accidents and persons killed and injured during the six years 1900 to 1905.

Year.	Gunpowder.			Dynamite and other nitro-compound blasting explosives.			Ammunition.			Fireworks.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No.o accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1900 . .	5	22	5	3	...	4	...	...	...	8	4	9
1901 . .	9	8	10	7	3	14	...	...	...	12	12	18
1902 . .	10	8	8	2	1	4	...	...	...	25	22	40
1903 . .	5	9	1	7	5	18	...	...	...	20	8	26
1904 . .	11	25	30	5	3	10	1	...	1	13	10	9
1905 . .	7	6	3	10	6	19	...	...	...	15	13	26
Total .	47	78	57	34	18	6	1	...	1	93	69	128
Average .	8	13	9	6	3	11	1	...	1	15	11	21

Year.	Petroleum.			Chemicals.			Miscellaneous.		
	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.	No. of accidents.	Persons killed.	Persons injured.
1900 . .	3	14	...	6	1	11	...	...	...
1901 . .	6	21	3	4	1	1	...	...	...
1902 . .	3	7	1	5	2	2	2	4	...
1903 . .	9	13	14	2	6	3	...	...	...
1904 . .	8	42	10	4	...	9	5	...	1
1905 . .	12	7	13	...	...	...	...	...	...
Total .	41	104	41	21	10	26	7	4	1
Average .	7	17	7	4	2	4	1	1	...

APPENDIX G.

Comparative Statement showing the number of accidents and persons killed and injured during the six years 1900 to 1905.

Year.	Accidents causing loss of life or bodily injury.			Accident not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	Number of persons			
		Killed.	Injured.		
1900	23	41	29	2	25
1901	32	45	46	6	38
1902	42	44	55	5	47
1903	35	41	62	8	43
1904	40	80	70	7	47
1905	40	32	61	4	44
Total	212	283	323	32	244
Average	35	47	54	5	41

APPENDIX H.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1905 to 31st December 1905.

No.	Date of accident.	Nature of Explosives.	Where accident occurred.	Circumstances of accident so far as ascertained.	Number of Persons	
					Killed.	Injured.
Government Accidents.						
1	11th April 1905	6·3-inch Howitzer Common Shell.	Quetta Arsenal	The Ordnance Officer, Quetta Arsenal, reported that three 6·3-inch Howitzer Common Shell were being emptied, one had the primer extracted and charge wetted, the other two were having the primers extracted and a Sergeant was taking out the primer from one of them with a Hook G. S. Wad when the explosion occurred. The powder in the two shells had not been wetted as the wetting is done after the primer is removed. The accident was supposed to have been caused by some grit getting in the primer, and that the Hook G. S. Wad tearing the shaloon (which may have perished) as the primer was being extracted, and passing rapidly through the dry powder, the grit ignited the same. A Board of Enquiry was held and were of opinion that the primers of shells used by Heavy Ordnance should be damped before they are extracted from the shells.	5	1
2	20th August 1905.	Powder charge	Rangoon	The Officer Commanding the Rangoon Brigade reported that when a gunner was preparing to fire the Time Gun on the night of the 20th August, the charge exploded seriously injuring the gunner. From the evidence it appeared that some broken glass was found in the bore of the gun which caused the explosion when the charge was being rammed. It was believed that the glass was placed in the bore by some malicious person who remained undiscovered.	...	1
3	12th December 1905.	Cap composition	Dum-Dum	The Superintendent, Ammunition Factory reported that, while a native was destroying unserviceable caps, the composition exploded injuring him.	...	1
				TOTAL	5	3

APPENDIX I.

Statement showing the import of explosives by sea into British India from other countries in the year 1905.

	Imports in 1905.					
	Bengal.	Bombay.	Sind.	Madras.	Burma.	Total.
Quantity.						
Gunpowder, black . . . . lbs.	66,351	83,000	6,250	40,850	6,300	202,751
Gunpowder, smokeless . . . . „	10,200	10,450	22,975½	1,250	250	45,125½
Dynamite . . . . . „	79,968	40,000	20,000	30,000	80,000	249,968
Blasting Gelatine . . . . . „	...	...	...	557,700	500	558,200
Gelignite or Gelatine Dynamite . „	20,048	6,000	...	97,000	...	123,048
Other nitro-compound explosives . „	49,392	60,083	...	...	...	109,475
Detonators . . . . . No.	...	120,000	150,000	1,455,000	72,000	1,797,000
Fireworks . . . . . lbs.	...	1,184,690	8,470	149,910	18,191	1,661,229
Total . lbs.	225,959	1,684,223	57,651½	876,719	105,241	2,949,796½
Total . No.	...	120,000	150,000	1,455,000	72,000	1,797,000
Value in Rupees.						
Gunpowder, black	54,520	35,142	1,906	20,463	7,765	1,19,805
Gunpowder, smokeless . . .	31,231	21,020	37,353	4,135	925	94,664
Dynamite	64,687	31,790	15,922	23,146	60,000	1,95,545
Blasting Gelatine	...	...	...	5,26,528	595	5,27,123
Gelignite or Gelatine Dynamite .	16,171	4,770	...	76,880	...	97,821
Other nitro-compound explosives .	26,621	30,717	...	...	...	57,338
Detonators	9,383	2,026	2,826	28,290	755	43,280
Fireworks	24,327	3,31,388	4,378	19,897	9,053	3,89,043
Total . Rs.	2,26,949	4,56,853	62,385	6,99,339	79,093	15,24,619

APPENDIX J.

Comparative Statement showing the import of explosives by sea into British India from other countries during the five years 1901 to 1905.

		1901.	1902.	1903.	1904.	1905.
Gunpowder, black	lbs.	178 259	211,035	272,423	473,925	202,751
Gunpowder, smokeless	„	17,379	26,605	31,004	48,246	45,125½
Dynamite	„	355,080	189,896	416,480	149,968	249,968
Blasting Gelatine	„	610,000	725,000	843,432	895,040	558,200
Gelignite or Gelatine Dynamite	„	61,950	50,000	22,095	55,048	123,048
Other nitro-compound explosives	„	125,529	107,071	222,104	130,811	109,475
Detonators	No.	2,679,000	3,297,509	4,388,400	3,020,000	1,797,000
Fireworks	lbs.	833,268	1,147,223	1,971,317½	2,264,162	1,661,229
TOTAL	lbs.	2,181,465	2,456,830	3,778,856½	4,017,200	2,949,796½
TOTAL	No.	2,679,000	3,297,509	4,388,400	3,020,000	1,797,000

APPENDIX K.

Statement showing the quantity of dangerous and non-dangerous petroleum imported by sea into British India during the year 1905.

	Dangerous.	Non-dangerous.	
	Gallons.	Gallons.	
Chittagong	.....	3,970,269	
Balasore	.....	10,000	
Chandbali	.....	367,500	
Calcutta	14,500	27,144,014	
Bombay	66,017*	22,099,928	* Includes composition paint and rubber solution.
Sind	622	5,157,947	
Madras	7,828	9,765,384	
Burma	5	1,595,209	
TOTAL .	88,972	70,110,251	

Statement showing the quantity of dangerous and non-dangerous petroleum produced in Assam and Burma during the year 1905.

	Dangerous.	Non-dangerous.	
	Gallons.	Gallons.	
Assam	21,014	1,543,212	
Burma	11,988,220	67,062,170*	* Refined petroleum.
TOTAL .	12,009,234	68,605,382	

APPENDIX L.

Statement showing the quantity of petroleum produced by the petroleum producing countries during the three years 1903 to 1905.

	1903.	1904.	1905.
	In tons.	In tons.	In tons.
America	12,557,000	15,000,000	17,000,000
Russia	10,320,000	10,600,000	6,500,000
Sumatra, Java and Borneo	830,000	1,000,000	1,200,000
Galicia	713,800	827,000	800,000
Roumania	384,300	455,000	568,000
India	325,400	404,000	465,000
Other countries	250,000	250,000	350,000
TOTAL	25,380,500	28,536,000	26,883,000

APPENDIX M.

No. 4694—3-12.

GOVERNMENT OF INDIA.

DEPARTMENT OF COMMERCE AND INDUSTRY.

NOTIFICATION.

EXPLOSIVES.

Simla, the 4th September 1905.

The Governor General in Council is pleased, in exercise of the powers conferred by sections 5 and 7 of the Indian Explosives Act, 1884 (IV of 1884), to make the following amendments in the rules to regulate the transport and importation of explosives published by the notification in the Home Department No. 5528, dated the 11th October 1901, as amended by notifications in the Home Department No. 620-Public, dated the 21st February 1902, and No. 2346-Public, dated the 11th June 1903.

AMENDMENTS.

I.—In rule 1, Class 6, *Ammunition class, after* the words "Division 1 comprises exclusively—safety cartridges, safety fuzes for blasting" *omit* the words—"Fuzes for shells; and tubes friction for guns, provided there be no more than five fuzes or 25 tubes in one package, and that the package be a hermetically sealed metal cylinder."

II.—For rule 2 *substitute* the following, namely:

"2. The following general rules shall be observed with respect to the packing of explosives for conveyance:

(1) Unless the context otherwise requires,—

the expression "outer package" means a box, barrel, case or cylinder, of wood, metal, or other solid material, of such strength, construction and character that it will not be broken or accidentally opened, nor become defective or insecure whilst being conveyed, and will not allow any explosive to escape;

the expression "inner package" means a substantial case, bag, canister, or other receptacle, made and closed so as to prevent any explosive from escaping;

the expression "authorized explosive" means exclusively an explosive included in a List of Authorized Explosives prepared by the Chief Inspector of Explosives with the Government of India, and published annually in the *Gazette of India*, and in force for the time being;

the expression "propellant" means an authorized explosive of Class 3, adapted and intended exclusively for use as a propelling charge in cannon or small arms; and

the expression "special authority" means a written authority granted by the Chief Inspector of Explosives, to which may be attached such conditions as may, in the opinion of the Chief Inspector of Explosives, be necessary to meet the special requirements of the case.

(2) The interior of every package shall be free from grit and otherwise clean.

(3) Save as hereinafter provided, there shall not be any iron or steel in the construction of any package unless the same is covered with suitable material so as effectually to prevent the exposure of such iron or steel.

(4) Every package when actually used for the packing of one explosive shall not be used for the packing of any other explosive or any other article or substance:

Provided that this rule shall not prevent the packing of inner packages containing a propellant in an outer package with inner packages containing gunpowder or another propellant:

Provided also that this shall not prevent the packing of any article which is not of an inflammable or explosive nature or liable to cause fire or explosion, in the same package as an explosive of the 1st Division of the 6th (Ammunition) Class.

(5) Subject to the foregoing provisions, the following shall be the method of packing authorized explosives of the various classes, respectively, and the maximum amounts which may be in any one package:

Class.	Method of packing.	Amount in any one outer package.	Amount in any one inner package.
Class 1	When the quantity in any one consignment does not exceed 5lbs. in amount, a single outer package; otherwise A double package, the inner and outer packages being as above defined.	100 lbs. Provided that where gunpowder and propellant are packed together the amount shall not exceed— 50 lbs.	100 lbs. 25 lbs.
Class 2	As for Class 1	50 lbs.	50 lbs.
Class 3, Division 1, other than propellants.	As for Class 1, provided that either the outer or inner package shall be thoroughly waterproof, and both shall be without metal in the construction thereof.	50 lbs.	5 lbs.
Class 3, Division 1, propellants.	As for Class 1	50 lbs.	50 lbs.
Class 3, Division 2, other than Picric Acid and Wet Guncotton.	As for Class 1	50 lbs.	50 lbs.
Picric Acid . .	As for Class 1	Unlimited.	Unlimited.
Guncotton so wetted with water as to be absolutely uninflammable.	As for Class 1, provided that the inner or outer package, or both of them, shall be of such a nature, and so closed, as to prevent any material loss of moisture during conveyance.	Unlimited.	Unlimited.
Class 4	As for Class 1	50 lbs.	50 lbs.
Class 5	Packed in water. A treble package, the innermost package being a bag permeable to water, enclosed in a case containing sufficient water to ensure the explosive being kept constantly wet; and the outer package containing sufficient water constantly to surround the case. Both the case and the outer package shall be of such construction as will not allow water to escape. If the explosive is of such character that it cannot be packed in a thoroughly wet condition, it shall be packed in accordance with conditions set forth in a special authority.	200 lbs.	25 lbs.
Class 6, Division 1, other than Pin-fire cartridges for pistols.	A single outer package: Provided that the above general rule (3) shall not apply to explosives of this Division. Provided also that bulleted cartridges of a calibre exceeding 0·5 inch and belonging to this Division shall be packed in such a manner that the point of any bullet cannot come in contact with the cap of another cartridge.	Unlimited.	.....
Pin-fire cartridges for pistols.	(*a*) Not exceeding 50 in number in any one consignment:—So packed in a single package that the bases lie alternately in opposite directions. The bases and pins shall be so fitted into perforations in millboard or other suitable material as to prevent the firing of any one of the said cartridges by an explosion in any other of the said cartridges.	50 in number.	.....
	(*b*) Exceeding 50 in number:—In an inner and outer package the cartridges being packed in inner packages with millboard as above required.	2,500 in number	50 in number.

Class.	Method of packing.	Amount in any one outer package.	Amount in any one inner package.
Class 6, Division 2 . .	Explosives made up into cartridges or charges for cannon, shells, torpedoes, mines, blasting or other like purposes, shall be packed in such manner and in such quantity as is required for the same explosive when not so made up; provided that where a double package is required, the enclosing case of such cartridges or charges may, if it satisfies the conditions required for an inner package, be held to be such inner package.	.....	.....
	Other ammunition of this Division:—A single outer package.	100 lbs. . .	.....
Class 6, Division 3, other than Detonators and Electric Detonators.	As for Class 1	50 lbs. . .	2 lbs. or 10 in number, whichever be the greater.
	Provided that bulleted cartridges of a calibre exceeding 0·5 inch and belonging to this Division shall be packed in such a manner that the point of any bullet cannot come in contact with the cap of another cartridge.		
Detonators . . .	(*a*) Not exceeding 1,000 in any one consignment:—As for Class 1, provided that the detonators and the spaces between the same and between the sides of the inner package and the said detonators shall all be filled, as far as practicable, with fine sawdust or other similar material; a layer of felt or other soft yielding material shall be placed between both ends of all the detonators and the interior of the inner package in which the same are placed, in such manner, and so secured, that both ends of the detonators will rest upon the said cotton wool or other material; every inner package, if of metal, to be lined throughout with paper or other soft material; and	1,000 in number	100 in number.
	(*b*) Exceeding 1,000 detonators:		
	The detonators shall be packed in inner packages, with sawdust and cotton wool as above described. Such inner packages shall be placed inside a substantial case of wood or metal, made and closed so as to prevent any of the inner packages escaping therefrom, and such case shall be placed inside an outer package in such manner and so secured as to leave a clear space of not less than three inches between the case and every part of the interior of the said outer package, notwithstanding that such clear space may, if preferred, be filled with sawdust, straw, or other similar material, or may contain a light framework or battens of wood to keep the case aforesaid in position in the outer package; and	10,000 in number	100 in number.
	(*c*) where the number of detonators exceeds 5,000, such outer package shall be provided with handles or other contrivance by means of which it can be safely and conveniently carried.		
Electric Detonators. .	As for Class 1, provided that where the number in any outer package exceeds 3,000, such outer package shall be provided with handles or other contrivance, by means of which it can be safely and conveniently carried.	5,000 in number.	100 in number.
Class 7, Division 1 . .	Double package, the inner package being hermetically closed, and contained in an outer package as above defined.	20 lbs. . .	1 lb.
Class 7, Division 2 . .	Single outer package, provided that the above general rule (3) shall not apply to explosives of this Division.	100 lbs. . .	.....

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

APPENDIX N.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Dated Calcutta, the 12th March 1906.

No. 353.—With reference to the Commerce and Industry Department Notification No. 4694-3-12, dated the 4th September 1905, publishing amendments made in the rules to regulate the transport and importation of explosives, published with the like Notification No. 5528, dated the 11th October 1901, the following list of "authorized explosives" referred to in rule 2 (1) of the above rules is published for general information:—

LIST OF AUTHORIZED EXPLOSIVES.

The following explosives are at present authorized for importation into British India for general sale:—

Class 1.—GUNPOWDER.

GUNPOWDER.

Class 2.—NITRATE MIXTURE.

RIPPLENE.

Class 3.—NITRO-COMPOUND.

Every explosive in this class and every explosive ingredient thereof shall be so thoroughly purified and otherwise of such character as to satisfy a test known as the heat test, and specified in Schedule A of Home Department Notification No. 5529-Public, dated the 11th October 1901.

Division 1.

ALBIONITE.
AMBERITE NO. 1.
BALLISTITE.
BLASTING GELATINE.
CARBONITE.
CELTITE.
CORDITE.
CORDITE, M. D.
DYNAMITE.
GELATINE DYNAMITE NO. 1.
GELATINE DYNAMITE NO. 2, OR GELIGNITE.
PHŒNIX POWDER.

Provided that every explosive in this division shall be of such character and consistency as not to be liable to liquefaction or exudation.

Division 2.

AMBERITE NO. 2.
AMMONITE.
COOPPAL'S POWDER.
E. C. SPORTING POWDER.
EMPIRE POWDER.
GUNCOTTON.
HENRITE
SCHULTZE GUNPOWDER.
KYNOCH'S SMOKELESS SPORTING POWDER.
NEGRO POWDER.
PICRIC ACID.

PICRIC POWDER.
RIFLEITE.
ROBURITE.
S. R. POWDER.
S. S. POWDER.
SMOKELESS POWDER.
SMOKELESS BLASTING POWDER.

Class 4.—CHLORATE MIXTURE.

Nil.

Class 5.—FULMINATE.

Nil.

Class 6.—AMMUNITION.

Division 1.

SAFETY FUZES FOR BLASTING.
SAFETY ELECTRIC FUZES.
PERCUSSION CAPS.
RAILWAY FOG SIGNALS.
SAFETY CARTRIDGES.

Division 2.

CARTRIDGES FOR CANNON, SHELLS, MINES, BLASTING OR OTHER LIKE PURPOSES.
CARTRIDGES FOR SMALL ARMS WHICH ARE NOT SAFETY CARTRIDGES.
ELECTRIC FUZES.
FUZES FOR BLASTING WHICH ARE NOT SAFETY FUZES.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.
WAR ROCKETS.

Division 3.

CARTRIDGES FOR SMALL ARMS, WHICH ARE NOT SAFETY CARTRIDGES.
DETONATORS.
ELECTRIC DETONATORS.
FUZES FOR BLASTING WHICH ARE NOT SAFETY FUZES.
FRICTION TUBES.
FUZES FOR SHELLS.
TUBES FOR FIRING EXPLOSIVES.

Class 7.—FIREWORK.

Division 1.

Nil.

Division 2.—Manufactured Fireworks.

MANUFACTURED FIREWORKS.
AMORCES.
CHINESE CRACKERS.

C. A. MUSPRATT-WILLIAMS, Major, R.A.,
Chief Inspector of Explosives in India.

APPENDIX O.

No. 244-20.

GOVERNMENT OF INDIA.

DEPARTMENT OF COMMERCE AND INDUSTRY.

Calcutta, the 12th January 1906.

NOTIFICATION.

EXPLOSIVES.

In exercise of the powers conferred by section 5 of the Indian Explosives Act, 1884 (IV of 1884), the Governor-General in Council is pleased to direct that the following sub-rule shall be added to rule 5 of the rules regulating the transport and importation of explosives, published in the Notification of the Government of India in the Home Department, No. 5528, dated the 11th October 1901 :—

Sub-Rule.

"111.—No explosive belonging to class 1 (gunpowder class), class 2 (nitrate-mixture class), class 3 (nitro-compound class), class 4 (chlorate-mixture class) or class 5 (fulminate class), shall be carried otherwise than by rail, across any railway bridge over which reasonable facilities for the conveyance thereof by rail are afforded by the Railway Administration."

"Provided that this prohibition shall not apply in respect of quantities of explosives of class 1 (gunpowder class) or class 3 (nitro-compound class) not exceeding 5 lbs. in weight."

W. L. HARVEY,
Secretary to the Government of India.

APPENDIX P.

No. 5484-4-10.

GOVERNMENT OF INDIA.

DEPARTMENT OF COMMERCE AND INDUSTRY.

NOTIFICATION.

EXPLOSIVES.

Simla, the 2nd October 1905.

In exercise of the powers conferred by section 17 of the Indian Explosives Act, 1884 (IV of 1884), and in supersession of Government of India, Home Department, Notification No. 1606-Public, dated the 31st July 1897, the Governor General in Council is pleased hereby to declare that,—

I.—Picric acid when in process of manufacture shall (for whatever purpose used or manufactured) be deemed to be an explosive within the meaning of the said Act, subject to the following exception :

(*a*) When the picric acid is mixed with not less than half its own weight of moisture in every process of manufacture, it shall be exempt from being deemed to be an explosive within the meaning of the said Act.

II.—Picric acid when kept, conveyed, imported or sold shall (for whatever purpose used or manufactured) be deemed to be an explosive within the meaning of the said Act, subject to the following exceptions:

(*a*) Picric acid mixed with not less than half its own weight of water shall be exempt from being deemed to be an explosive within the meaning of the said Act.

(*b*) Picric acid which does not fall within the exemption (*a*), when the quantity does not exceed two thousand pounds in any one ship, boat, carriage, building or place, shall be exempt from being deemed to be an explosive within the meaning of the said Act ; provided that such picric acid is so kept and conveyed as not to be liable, whether under the action of fire or otherwise, to come in contact with any substance specified in the schedule hereto, or with any fire or light capable of igniting such picric acid.

Provided also that such picric acid when dry is so packed in a substantial barrel or case that the contents cannot escape; and that no metal other than aluminium, or an alloy containing not less than ninety per centum of aluminium, is used in the construction of any package containing such picric acid, and that each barrel or case is legibly marked "Picric Acid."

Picric acid when not subject to the above exemptions must be packed and marked as laid down in the rules* relating to the packing of explosives prescribed by the Government of India.

* General Rules for Transport and Importation of Explosives.

III.—Picrates and mixture of picric acid with any other substance (for whatever purpose used or manufactured) shall be deemed to be explosives within the meaning of the said Act, subject to the following exception ;

(*a*) A picrate mixed with not less than half its own weight of water shall be exempt from being deemed to be an explosive within the meaning of the said Act.

SCHEDULE.

Any of the following metals or metalic oxides, namely, lead, oxide of lead, oxide of iron, potash, baryta, lime, soda, oxide of zinc, oxide of copper ; and any compound of such metal or oxide (other than a metalic sulphate) ; or any chlorate, nitrate, or other oxidizing agent; or any other substance declared by a Notification of the Government of India to be capable of forming with picric acid a dangerous compound.

Provided that this schedule shall not be deemed to include any metal, or oxide unavoidably formed on any metal, used in the construction of any ship, boat or carriage, or contained in any paint, where the packages containing picric acid are protected from direct contact with such metal or paint.

W. L. HARVEY,
Secretary to the Government of Ind ia

APPENDIX Q.

[Enclosure to the Railway Board's Circular No. R. T. 173, dated the 30th August 1905.]

Amendments in rule 14, of Part II and in Appendix B of the General Rules for working open lines of railway, which were promulgated with the Government of India, Public Works Department Circular No. 6 Ry., dated the 12th March 1895.

From rule 14, Chapter III, Part II, *expunge* the item "Gas, compressed, other than liquid carbonic acid gas secured in wrought iron cylinders or solid drawn steel flasks without seam. or join, certified by competent authority to withstand a pressure of 250 atmospheres (3,750 lbs.)_____D" and *substitute* the following:—

Gas, compressed, *viz.*:..... G. Compressed Oxygen. Compressed or liquefied Carbonic Acid Gas (Carbon Dioxide). Compressed Coal Gas. Compressed Hydrogen. Liquefied Anhydrous Ammonia or Compressed Ammonia Gas. Liquefied or Compressed Nitrous Oxide. Liquefied or Compressed Sulphurous Acid Gas (Sulphur Dioxide).	1. These gases must be packed in cylinders. 2. Cylinders must be made of wrought iron or mild steel of the best quality, containing not more than 0·25 per cent. of carbon thoroughly annealed after manufacture, of sufficient strength and efficiently tested and must not exceed 8 feet in length and 10 inches in diameter. 3. Cylinders must be separately and securely packed in a strong wooden case, or in a covering made of closely plaited 1 inch (circumference) hemp or coir; except that several small cylinders not exceeding 18 inches in length and 4 inches in diameter may be packed in one box provided each cylinder is contained in a separate compartment or is separately encased in closely plaited 1 inch (circumference) hemp or coir. Each box must not contain more than 25 cylinders and the gross weight of each box and contents must not exceed 3½ maunds. 4. Cylinders containing Atmospheric Air, Coal Gas, Hydrogen or Oxygen, must not be charged to a greater pressure than 1,800 lbs. per square inch. 5. No cylinder may contain, per pound of water capacity more than ¾lb. of Carbon Dioxide (Carbon Acid Gas); ½lb. of Anhydrous Ammonia, ¾lb. of Nitrous Oxide; or 1¼lbs. of Sulphur Dioxide (Sulphurous Acid Gas) respectively. 6. Cylinders must be carefully handled, and must not be exposed to the rays of the sun, nor to the heat of a fire, stove or other source of heat.

[Enclosure to the Railway Board's Circular No. R. T. $\frac{262A}{C}$, dated the 12th March 1906.]

In rule 14, Chapter III, Part II, as amended by the Railway Board's circular No. R. T. 173, dated the 30th August 1905, *add* the following as condition No. 7:—

7. No consignment of goods marked G in Rule 14 shall be accepted for carriage by rail unless the consignor has signed a certificate in the following form.

FORM OF CERTIFICATE.

CERTIFIED that the cylinder or cylinders containing_____ tendered by $\frac{me}{us}$ as per Forwarding No. _____ of this date to the_____railway for despatch to_____station $\frac{has}{have}$ been packed and tested in accordance, and that the cylinder or cylinders $\frac{complies}{comply}$ in every respect with the rules promulgated under the Railway Board's Circular No. R. T. 173, dated the 30th August 1905, to regulate the packing and carriage by railway in India of_____.

$\frac{I}{we}$ also certify that the consignment complies with the conditions that the cylinder or cylinders must be of wrought iron or mild steel of the best quality containing not more than 0·25 per cent. of carbon, thoroughly annealed after manufacture, of sufficient strength and efficiently tested.

Signature of $\frac{sender}{senders}$